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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,722	10/27/2003	Hiroshi Morioka	032045	9699

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EXAMINER

CHACKO DAVIS, DABORAH

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 08/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/692,722	Applicant(s) MORIOKA, HIROSHI	
	Examiner Daborah Chacko-Davis	Art Unit 1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-2, 4-6, 9-12, 14, and 17-22, are rejected under 35 U.S.C. 102(e) as being anticipated by U. S. Patent No. 6,579,808 (Cho et al., hereinafter referred to as Cho).

Cho, in the abstract, in col 3, lines 18-67, in col 4, lines 1-60, discloses a patterning forming method of forming a gate layer on the substrate, followed by an insulating layer, forming an organic antireflection layer on the insulating layer, forming a photoresist layer on the antireflecting layer, performing an exposure and development process on the photoresist layer to form a photoresist pattern (substrate at about room temperature), dry etching the sidewalls and top portions of the photoresist pattern using SO₂ , and He as the etch gas mixture; etching the antireflecting layer using the resist pattern as the mask, etching the insulating film (first film) using the patterned antireflecting layer as the mask, removing the resist pattern and the patterned antireflecting layer, forming the gate structure underlying the insulating film pattern (claims 1, 4-5, 9-11, 14, 17, and 19). Cho, in col 3, lines 62-63, discloses that the mixture of

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etch gases includes oxygen (claims 2, 6, 12, 18, and 20). Cho, in col 3, lines 28-31, discloses that the etch process further includes implanting ion to form source and drain regions, and a gate (claim 21). Cho, in col 4, lines 14-17, discloses that the over etch (additional etch) performed on the antireflecting coating and photoresist film results in a reduced dimension of the same (claim 22).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3, 7-8, 13, and 15-16, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 6,579,808 (Cho et al., hereinafter referred to as Cho) in view of U. S. Patent No. 6,187,688 (Ohkuni et al).

Cho is discussed in paragraph no. 2.

The difference between the claims and Cho is that Cho does not disclose that the flow rate of the first gas is equal to or greater than 40% of a flow rate of the mixture gas (claims 3, and 13). Cho does not disclose increasing the flow rate of the SO₂ gas to a flow rate of the oxygen gas during etching (claims 7, and 15). Cho does not disclose that the flow rate of SO₂ gas is increased when the time necessary for etching a whole thickness of the antireflection film elapses (claims 8, and 16).

Ohkuni, in col 15, lines 28-32, and in Table 13, discloses that the flow rate of the first gas and the flow rate of the SO₂ gas are about equal (above 40% of the flow rate of the SO₂ gas). Ohkuni, in col 10, lines 50-53, in col 11, lines 1-29, discloses that the flow rate of the SO₂ gas is maintained higher than the flow rate of the oxygen during the dry etch process of the antireflecting film.

Therefore, it would be obvious to a skilled artisan to modify Cho by employing the flow rates of the first gas and the flow rate of the SO₂ gas as suggested by Ohkuni because Ohkuni, in col 15, lines 20-29, discloses that employing the nitrogen gas (first gas) in the claimed rate prevents the residue formation on the antireflection film pattern and thereby avoids the formation of a defective underlying film pattern (polySi); and because Ohkuni, in col 13, lines 63-67, discloses that increasing the flow rate of the SO₂ gas results in a positive size variation in the sidewalls of the antireflection pattern.

5. Claims 23-26, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent No. 6,579,808 (Cho et al., hereinafter referred to as Cho) in view of U. S. Patent Application Publication No. 2003/0134231 (Tsai et al., hereinafter referred to as Tsai).

Cho is discussed in paragraph no. 2.

The difference between the claims and Cho is that Cho does not disclose that the etching of the resist pattern reduces the width of the resist pattern (claims 23-26).

Tsai, in [0007], discloses that SO₂/O₂ mixture gas is used to reduce the resist pattern width (reduction in critical dimension, i.e., reduction in pattern width).

Therefore, it would be obvious to a skilled artisan to modify Cho by performing the etch process suggested by Tsai to reduce the pattern width because Tsai, in [0007], discloses that performing the etch process on the resist pattern increase the etching process anisotropy and reduces microloading effects.

Response to Arguments

6. Applicant's arguments filed May 18, 2006, have been fully considered but they are not persuasive. The 102 and 103 rejections made in the previous office action (paper no. 0306) are maintained.

A) Applicants argue that Cho does not disclose etching the surface layer and the top wall of the resist pattern.

Cho teaches forming a resist pattern followed by performing an etch process, with the claimed gas mixture, on the resist pattern without masking the resist pattern. Therefore, the etch process etches the top surface as well as the sidewalls of the resist pattern.

B) Applicants argue that Cho does not have lateral etch properties and that the lateral surfaces are not etched.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., etch process possessing lateral etch properties) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from

the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Also, see argument A.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd

August 7, 2006.



JOHN A. MCPHERSON
PRIMARY EXAMINER